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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/862,524	05/22/2001	Martin Franz	YOR9-2001-0230 (8728-504)	1220

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EXAMINER	
ALI, MOHAMMAD	

ART UNIT	PAPER NUMBER
2177	

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4

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

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Office Action Summary	Application No. 09/862,524	Applicant(s) FRANZ ET AL.	
	Examiner Mohammad Ali	Art Unit 2177	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *13* is/are allowed.

6)☒ Claim(s) *1-12 and 14-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 April 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-22 are pending in this Office Action.

Drawings

2. The drawings filed on April 02, 2004 are objected by the Examiner. In the drawings applicant's name and docket number should be deleted. Formal and corrected drawings will be required when the application will be allowed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-12 and 14-22 are rejected under 35 U.S.C. 102(b) as being unpatentable over Rosenbaum et al. ('Rosenbaum' hereinafter), US Patent 4,384,329 in view of Liddy et al. ('Liddy' hereinafter), US Patent 5,873,056.

With respect to claim 1,

Rosenbaum discloses a method of indexing a database of documents (col. 5, lines 29-36). Rosenbaum teaches 'providing a vocabulary of n terms' as receives an input word and uses the first four characters of the input word to search the vocabulary index in memory for the starting address in memory of the vocabulary data base segment containing the input word (see col. 4, lines 66 to col. 5, lines 3). Further, Rosenbaum discloses indexing the database in the form of a non-negative nxm index matrix V (see col. 2, lines 3-4). Rosenbaum teaches 'm is equal to the number of documents in the database' as data base structure includes devising a NXN binary matrix where N is equal to the number of words in the vocabulary (see col. 2, lines 2-4). Further, Rosenbaum teaches 'n is equal to the number of terms used to represent the database' as each vertical column in the matrix corresponds to the number of words in the synonym or antonym dictionary. Each row has a binary "1" bit set in the column position corresponding to each other word that is a synonym or antonym for the word defined by the row (see col. 2, lines 8-15 et seq). Rosenbaum teaches 'the value of each element Vij of index matrix V is a function of the number of occurrences of the ith vocabulary term in the jth document' as synonym and antonym data base structures and text processing system control for interactively accessing these data base

structures is implemented by devising a symmetric binary matrix storage organization which creates a word-wise relational data base linking the respective entries in a word list for retrieval while using minimum storage and without incurring entry redundancy (see col. 1, lines 62 to col. 3, lines 2 and Fig. 2). Rosenbaum teaches 'factoring out non-negative matrix factors T and D such that V=TD' as overall size of the matrix is reduced by run-length encoding the number of column positions between 1 bits in each row (col. 2, lines 15-17 et seq). Finally Rosenbaum teaches 'wherein T is an nxr term matrix, D is and rxm document matrix, and r<nm/(n+m)' as (see col. 2, lines 2-11 and col. 4, lines 55-64, Fig. 2).

Rosenbaum does not explicitly indicate the claimed "non-negative matrix".

Liddy discloses claimed non-negative matrix (only the positive "non-negative" coefficients are used in the matrix, see col. 8, lines 23-24).

It would have been obvious to one ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references, because non-negative matrix of Liddy's teachings would have allowed Rosenbaum's system to retrieve documents by their general subject content with statistically guided word sense disambiguation, as suggested by Liddy at col. 1, lines 8-11. Further, non-negative matrix as taught by Liddy improves to classify documents by their subject content and representing the documents by a vector representation derived from subject field codes assigned to the words of the document (see col. 1, liens 23-28, Liddy).

As to claim 2,

Rosenbaum teaches ‘deleting said index matrix V’ as the vocabulary index access address is updated ‘delete’ at logic block by adding the displacement to the next word number. At logic block the vocabulary index number is tested to determine if all the synonyms for the input word have been accessed (see col. 5, lines 60-67).

As to claim 3,

Rosenbaum teaches deleting said term matrix T as the vocabulary index access address is updated ‘delete’ at logic block by adding the displacement to the next word number. At logic block the vocabulary index number is tested to determine if all the synonyms for the input word have been accessed (see col. 5, lines 60-67 et seq).

As to claim 4,

Rosenbaum teaches wherein r is at least one order of magnitude smaller than n (see col. 5, lines 1-35 et seq).

As to claim 5,

Rosenbaum teaches wherein r is from two to three orders of magnitude smaller than n (see col. 4, lines 55-64, Fig. 2 et seq) .

As to claim 6,

Rosenbaum teaches wherein entries of said document matrix D falling below a predetermined threshold value t are set to zero (see col. 5, lines 60-67).

As to claim 7,

Rosenbaum teaches wherein r is at least one order of magnitude smaller than n (see col. 5, lines 1-25 et seq).

As to claim 8,

Rosenbaum teaches wherein r is from two to three orders of magnitude smaller than n (see Abstract, col. 2, lines 56-67 et seq).

As to claim 9,

Rosenbaum teaches wherein entries of said document matrix D falling below a predetermined threshold value t are set to zero (see col. 5, lines 1-50 et seq).

As to claim 10,

Rosenbaum teaches wherein r is at least one order of magnitude smaller than n (see col. 5, lines 1-50).

As to claim 11,

Rosenbaum teaches wherein r is from two to three orders of magnitude smaller than n (see col. 5, lines 1-50 et seq).

As to claim 12,

Rosenbaum teaches wherein entries of said document matrix D falling below a predetermined threshold value t are set to zero (see col. 5, lines 33-51 et seq).

With respect to claim 14,

Rosenbaum discloses a program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for indexing a database of documents, said method steps comprising (see col. 5, lines 55-67, Fig. 2): Rosenbaum teaches 'providing a vocabulary of n terms' as receives an input word and uses the first four characters of the input word to search the vocabulary index in memory for the starting address in memory of the vocabulary data base segment containing the input word (see col. 4, lines 66 to col. 5, lines 3);

Rosenbaum teaches 'indexing the database in the form of a non-negative nXm index matrix V' as (see col. 2, lines 3-4), wherein: m is equal to the number of documents in the database as (see col. 2, lines 3-4); Rosenbaum teaches 'n is equal to the number of terms used to represent the database' as synonym and antonym data base structures and text processing system control for interactively accessing these data base structures is implemented by devising a symmetric binary matrix storage organization which creates a word-wise relational data base linking the respective entries in a word list for retrieval while using minimum storage and without incurring entry redundancy (see col. 1, lines 62 to col. 3, lines 2 and Fig. 2) ; and Rosenbaum teaches 'the value of each element v.sub.ij of index matrix V is a function of the number of occurrences of the i.sub.th vocabulary term in the j.sub.th document' as (see col. 5, lines 1-15); Rosenbaum teaches 'factoring out non-negative matrix factors T and D such that V.apprxeq.TD' as (see Abstract et seq); and Rosenbaum teaches 'wherein T is an n.times.r term matrix, D is an r.times.m document matrix, and r<nm/(n+m)' as (see col. 5, lines 1-15 et seq).

Rosenbaum does not explicitly indicate the claimed "non-negative matrix".

Liddy discloses claimed non-negative matrix (only the positive "non-negative" coefficients are used in the matrix, see col. 8, lines 23-24).

It would have been obvious to one ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references, because non-negative matrix of Liddy's teachings would have allowed Rosenbaum's system to retrieve documents by their general subject content with statistically guided word sense

disambiguation, as suggested by Liddy at col. 1, lines 8-11. Further, non-negative matrix as taught by Liddy improves to classify documents by their subject content and representing the documents by a vector representation derived from subject field codes assigned to the words of the document (see col. 1, liens 23-28, Liddy).

With respect to claim 15,

Rosenbaum discloses a database index (see col. 2, lines 3-4), comprising: Rosenbaum teaches ‘an r.times.m document matrix D, such that V.apprxeq.TD wherein T is an n.times.r term matrix’ as as data base structure includes devising a NXN binary matrix where N is equal to the number of words in the vocabulary (see col. 2, lines 2-4); Rosenbaum teaches ‘V is a non-negative nXm index matrix , wherein each of its m columns represents an j.sup.th document having n entries containing the value of a function of the number of occurrences of a i.sup.th term appearing in said j.sup.th document; and wherein T and D are non-negative matrix factors of V and r<nm/(n+m)’ as (see col. 5, lines 55-67 et seq); and Rosenbaum teaches ‘wherein each of the m columns of said document matrix D corresponds to said j.sup.th document’ as (see col. 5, lines 33-50 et seq).

Rosenbaum does not explicitly indicate the claimed “non-negative matrix”.

Liddy discloses claimed non-negative matrix (only the positive “non-negative” coefficients are used in the matrix, see col. 8, lines 23-24).

It would have been obvious to one ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references, because non-negative matrix of Liddy’s teachings would have allowed Rosenbaum’s system to

retrieve documents by their general subject content with statistically guided word sense disambiguation, as suggested by Liddy at col. 1, lines 8-11. Further, non-negative matrix as taught by Liddy improves to classify documents by their subject content and representing the documents by a vector representation derived from subject field codes assigned to the words of the document (see col. 1, liens 23-28, Liddy).

With respect to claim 16,

Rosenbaum discloses a method of information retrieval, comprising (see col. 5, lines 55-67, Fig. 2): Rosenbaum teaches 'providing a query comprising a plurality of search terms' as receives an input word and uses the first four characters of the input word to search the vocabulary index in memory for the starting address in memory of the vocabulary data base segment containing the input word (see col. 4, lines 66 to col. 5, lines 3); Rosenbaum teaches 'providing a vocabulary of n terms' as receives an input word and uses the first four characters of the input word to search the vocabulary index in memory for the starting address in memory of the vocabulary data base segment containing the input word (see col. 4, lines 66 to col. 5, lines 3); Rosenbaum teaches 'performing a first pass retrieval through a first database representation and scoring m retrieved documents according to relevance to said query' as synonym and antonym data base structures and text processing system control for interactively accessing these data base structures is implemented by devising a symmetric binary matrix storage organization which creates a word-wise relational data base linking the respective entries in a word list for retrieval while using minimum storage and without incurring entry redundancy (see col. 1, lines 62 to col. 3, lines 2 and Fig. 2); Rosenbaum

teaches 'executing a second pass retrieval through a second database representation and scoring documents retrieved from said first pass retrieval so as to generate a final relevancy score for each document' as (see col. 5, lines 1-50 et seq); and Rosenbaum teaches 'wherein said second database representation comprises an rXm document matrix D, such that V.apprxeq.TD wherein T is an nXr term matrix' as (see col. 5, lines 55-67 et seq); Rosenbaum teaches 'V is a non-negative nXm index matrix , wherein each of its m columns represents an j.sup.th document having n entries containing the value of a function of the number of occurrences of a i.sup.th term of said vocabulary appearing in said j.sup.th document' as (see col. 5, lines 1-15, Figs. 2-3); and Rosenbaum teaches 'wherein T and D are non-negative matrix factors of V and r<nm/(n+m)' as (see col. 2, lines 2-4 and col. 5, lines 1-15); and Rosenbaum teaches 'wherein each of the m columns of said document matrix D corresponds to said j.sup.th document' as (see col. 5, lines 55-67 et seq).

Rosenbaum does not explicitly indicate the claimed "non-negative matrix".

Liddy discloses claimed non-negative matrix (only the positive "non-negative" coefficients are used in the matrix, see col. 8, lines 23-24).

It would have been obvious to one ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references, because non-negative matrix of Liddy's teachings would have allowed Rosenbaum's system to retrieve documents by their general subject content with statistically guided word sense disambiguation, as suggested by Liddy at col. 1, lines 8-11. Further, non-negative matrix as taught by Liddy improves to classify documents by their subject content and

representing the documents by a vector representation derived from subject field codes assigned to the words of the document (see col. 1, liens 23-28, Liddy).

As to claim 17,

Rosenbaum teaches 'wherein said final relevancy score for any j.sup.th document is a function of said j.sup.th document s corresponding entry in said document matrix D and the corresponding entries in said document matrix D of the .GAMMA. top-scoring documents from said first pass retrieval' as (see col. 5, lines 33-50, Fig. 2).

As to claim 18,

Rosenbaum teaches 'wherein said relevancy score function for said j.sup.th document is proportional to a sum of cosine distances between said j.sup.th document s corresponding entry in said document matrix D and each of said corresponding entries in said document matrix D of the .GAMMA. top-scoring documents from said first pass retrieval' as (see col. 5, lines 33-50 et seq).

As to claim 19,

Rosenbaum teaches wherein r is at least one order of magnitude smaller than n (see Abstract et seq).

As to claim 20,

Rosenbaum teaches wherein r is from two to three orders of magnitude smaller than n (see col. 5, lines 1-15 et seq).

As to claim 21,

Rosenbaum teaches wherein entries of said document matrix D falling below a predetermined threshold value t are set to zero (see col. 5, lines 33-50).

With respect to claim 22,

Rosenbaum discloses a program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for information retrieval, said method steps comprising (see col. 1, lines 63 to col. 2, lines 24, Fig. 2): Rosenbaum teaches 'providing a query comprising a plurality of search terms' as receives an input word and uses the first four characters of the input word to search the vocabulary index in memory for the starting address in memory of the vocabulary data base segment containing the input word (see col. 4, lines 66 to col. 5, lines 3); Rosenbaum teaches 'providing a vocabulary of n terms' as receives an input word and uses the first four characters of the input word to search the vocabulary index in memory for the starting address in memory of the vocabulary data base segment containing the input word (see col. 4, lines 66 to col. 5, lines 3); Rosenbaum teaches 'performing a first pass retrieval through a first database representation and scoring m retrieved documents according to relevance to said query' as data base structure includes devising a NXN binary matrix where N is equal to the number of words in the vocabulary (see col. 2, lines 2-4); Rosenbaum teaches 'executing a second pass retrieval through a second database representation and scoring documents retrieved from said first pass retrieval so as to generate a final relevancy score for each document; and wherein said second database representation comprises an r.times.m document matrix D, such that V.apprxeq.TD wherein T is an n.times.r term matrix' as

(see col. 5, lines 1-50 et seq); Rosenbaum teaches 'V is a non-negative n.times.m index matrix, wherein each of its m columns represents an j.sup.th document having n entries containing the value of a function of the number of occurrences of a i.sup.th term of said vocabulary appearing in said j.sup.th document' as (see col. 5, lines 33-67, Fig. 2); and Rosenbaum teaches 'wherein T and D are non-negative matrix factors of V and r<nm/(n+m)' as (see col. 2, lines 3-4 et seq); and Rosenbaum teaches 'wherein each of the m columns of said document matrix D corresponds to said j.sup.th document' as (see col. 2, lines 2-11 and col. 4, lines 55-64, Fig. 2).

Rosenbaum does not explicitly indicate the claimed "non-negative matrix".

Liddy discloses claimed non-negative matrix (only the positive "non-negative" coefficients are used in the matrix, see col. 8, lines 23-24).

It would have been obvious to one ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references, because non-negative matrix of Liddy's teachings would have allowed Rosenbaum's system to retrieve documents by their general subject content with statistically guided word sense disambiguation, as suggested by Liddy at col. 1, lines 8-11. Further, non-negative matrix as taught by Liddy improves to classify documents by their subject content and representing the documents by a vector representation derived from subject field codes assigned to the words of the document (see col. 1, liens 23-28, Liddy).

Allowable Subject Matter

5. Claim 13 is allowed.

The following is an examiner's statement of reasons for allowance: The prior art made of record does fairly teach or suggest the combination of all elements specifically the formula as recited in the independent claim 13.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 4,823,306 issued to Barbic et al. teaches matrix and vocabulary.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Ali whose telephone number is (703) 605-4356. The examiner can normally be reached on Monday to Thursday from 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (703) 305-9790 or Customer Service (703) 306-5631. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for any communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-9600.

Mohammad Ali

Patent Examiner

AU 2177

MA

June 08, 2004